BARK BEETLE TECHNICAL WORKING GROUP
Agenda Items and Meeting Notes 2013 MTG (Hood River, OR)

Wednesday, October 30 (30 people present)

Agenda Items

Start (8:00) *-Beth Willhite, moderator*
- Welcome, housekeeping items, local information, etc.
- Review of action items from 2012 meeting and 2012 WFIWC workshop
- New business
- Condition Reports: handouts, roundtable unusual/notable events, questions

WO Update (10:15- 11:00) *- Bob Rabaglia, WO FHP*
- WO FHP News
- National Early Detection-Rapid Response System (EDRR)
- Verbenone on-line database
- Questions for Bob

Other Updates (11:00- 2:30)
- Western Bark Beetle Research Group – *Rob Progar, PNW*
- FINDIT – *Brytten Steed, R1 FHP*
- High Elevation Five Needle Pine (High-Five) Database –*Brytten Steed, R1 FHP*
- "Western Forest Insects" – *Iral Ragenovich, R6 FHP*
- FIDLs – *Iral Ragenovich, R6 FHP*
- BBTWG website
- Identification Aids – *Jim LaBonte, ODA*
- Recent semiochemical advances - *Dave Wakarchuk, Synergy*
- Harold Thistle (FHTET) funding for 2014 bark beetle projects – *Har thru email w/ Beth*

Bark Beetle Projects and Studies (2:45 – 5:00)

P/S/R, EM, STDP, FS-PIAP and others; recently completed, on-going, proposed, wish list
- Mountain pine beetle
- Douglas-fir beetle
- Spruce beetle
- Jeffrey pine beetle
- Western pine beetle

NOTES:

Introductions all around (Appendix A for list of attendees)

Mission Statement (Appendix B for version presented)
- *(Note to look at this since we'll vote on approving it later tomorrow)*

Priority list for research (Appendix C for ver. 12-17-2012 presented). To what purpose?
- Identity issue for group…why meet and towards what end?
- Researchers increasingly absent: soft $ has other priorities. US (old way) govt. sponsored researchers in partnership with FHP doing mission-sponsored projects; researchers in FS now on soft $ of necessity (and few academics anymore); RMRS station director places low emphasis on native insects now… Barb Bentz talks with Beth last week, says old way/model is broken.
- List is so long it's not priority list it's a laundry list – can we/should we cut it down to smaller number of high priority items?
- There are other documents presenting bark beetle priorities – shown combined lists (WBBI 2006); Joel McMillin's white paper from DC; FHP strategic plan) and there is a priority list with NAMES

- Is any of the STDP $ given research? Provide consistency. Allow FS researchers to do wok needed by USFS-NFS again
- Can we come up with joint project?
- Previous 2 points = a systemic problem – do we need to bring this up higher? USFS Research hurting, barely enough $ for salaries, National Entomologist position open for over 1 year. A letter? Note - EM projects have many USFS researchers and FHP names together, why aren't they here to continue this interaction? Didn't the WBBI identify this gap? They have to get credit for meetings – means giving a presentation usually. They have a big problem in research…Should we write letter, our needs aren't being met…surely FS-Research knows.
- Have the state forester push this? More weight than a letter from us. The state foresters are already pushing for FHP help. Have FHP-directors say something to them "So if we do this, what are we going to lose?" State forester
- "if there is a fire, there is always money" – well, we do forest health to prevent these bad fires. Why not help with this?
- TELL YOUR DIRECTOR - **(OPPORTUNITY)**
- Western Competitive Grants and Western Fire Mgmt. Grants
  - Shift toward research? Change emphases"
  - Aimed at State and Private Lands strictly
  - Monitoring and education
  - Leverage comes from cooperating with nearby landowners
- Any document ought to say:
  - Land managers need help, their needs aren't being met
  - More outbreaks, more problems, broken model
  - Ought to be a briefing paper, NOT a letter from us
    - Talking points
  - SUMMARIZE situation

ACTION ITEM: Briefing paper for Research

- needs of land managers are not being met
- summarize situation – many researchers on soft money - not receiving base funding, priorities of outside funding different than land managers and applied needs (exceptions: FHP funding programs e.g., FHM-EM, STDP)
- concerns about further reductions in Entomology/Pathology Research staff
- concerns about change in research priorities direction to focus on invasives – BBTWG feels it is important to continue work on native insects (*change to couch in terms of change in research outcomes due to funding mechanisms?*)

Responsible Parties: Darren Blackford, Chris Fettig, Iral Ragenovich, Nancy Sturdevant, Joel McMillin, Beth Willhite

ACTION ITEM: Develop a spreadsheet of projects completed through BBTWG

- populate with projects and status of publications that result
- put on the O-drive for people to add projects to it (however, states will not be able to access).
- this will not be a public document.

Responsible Party: Brytten Steed

Updates on conditions: See handouts –no details provided here

- R1 MT (1); IDL R1&4(2); R2; R3 AZ field office; R4 Boise; R4 Ogden; R5; R6
- Of Note: MPB arose in SW white pine post-fire…change tune?!
  Ips hunteri outbreak in blue spruce in AZ

WO Update (Bob Rabaglia)
(Bob Cain, Susan Grey, Steve Munson, Joel Egan were online – Beverly Bulaon was on the phone)]
Program & Budget Info:

FHP Core areas, 2013 FAD acres:

- Tech Assistance
- Survey: ~50% acres with mortality by MPB (480 x 10^6 surveyed total)
- Treatments: 90% to Gypsy Moth-slow the spread
- Methods/Tech Development

- GM program: Eradication - $24,000 in 2013, Slow the spread - $7.7 X 10^6 , cost effective, B/C = 3:1, Suppression down since 2009 $965,000 in 2013
- Overall $30MM down since 2010 in FHP, Gypsy moth steady, other things down.
- EAB = APHIS $30MM down in 2014, 5MM in 2013 – spending less,
  - No more eradication efforts? If >3 years there, will not try to eradicate (e.g. NH and MA)
  - Enforce quarantine and regulatory
  - Spend $$ on biocontrol
  - Where do we fit in? work with state partners
  - No inspection within quarantine area
  - $12.7MM spent in 2011-2013 by USFS Research and Methods Development gets most. USFS Research includes salary.
- Budget – FY13 – CR funded at 2012 – $111.9MM less 7MM sequestration and late authorization
- FY14 - ?? President's budget - $104MM for FHP therefore TOUGH decisions coming. Recall 4 core areas, need to "chunk out" what we're going to do
- Core:
  - Salary and Tech assistance = ~55% of FHP budget and $$ to states
  - Survey and Monitoring (EDRR, SOD baiting, TCD…) does not include ADS. = < 5% of FHP budget
  - Methods development (STDP, FPIAP, Sirex, etc.) = < 6% of FHP budget
  - Treatments = ~35% of FHP budget
  - We'll need to find ~$7MM to cut somewhere. The Regional/Area Directors of FHP will have to decide. A lot depends upon who the new FH director is…. Redesign not needed if they go with President's budget. There are 4 budget lines for FHP: Federal, Coop, Fire Plan Federal, Fire Plan State & Private.
  - Can we assess anyone or get $$ from somewhere? Well, FHP manages zero land, so where could we?
  - Sequestration likely.

Exotics and ID tools

- EDRR – no new finds in 2013 – 10 states including Puerto Rico. $750K in 2011, down $300K in 2013. Identify high risk and focus there, rotate in some. Probably can do 9 states per year.
- Developed interactive on-line lucid key to Xyleborine ambrosia beetles (www.ambrosiasymbiosis.org)
- Funded barkbeetles.info (Rich Atkinson); Atkinson will update barkbeetles.info
- Image and database of the SL Wood Collection at the Smithsonian (funded a student (now a post doc); about 1,200 types.
- May have to do less of this development now, though
- In2013 funded ambrosia beetle fungal associate ID and some test lures for cerambycids (maybe combine into EDRR and APHIS port work)
- Any international interaction with Canada or Mexico? Some with Canadian Dept. of Forestry
- Other keys – Colorado State University has some on line

Verbenone database –

- Judy Adams retires at the end of this week, has kept this database the EDRR – will ask Frank Sapio where it goes from now
- Are we entering data? Well, some… Lots of long faces in room, data on desk not in (database) **(OPPORTUNITY)**
- 2010 started it, 2011 treatments entered
- Not research, but try to find consistencies, some time to do analysis… where verbenone would work or not…
- Well, MPB is running out of host and crashing, so fewer entries are anticipated. NFS prefers carbaryl.

Jim LaBonte – novel twig beetle damage in OR – Douglas-fir and Christmas tree plantations.

- Christmas trees in Oregon are a $102MM/year industry; this year 30-40K trees had to be rogued, about $500,000 loss
- tiny beetles under bark, identified as *Pityophthorus pseudotsugae* (ID confirmed by Don Bright). Symptoms – frass at branch crotches.
- NOVEL – no record of this before
  - Was it caused by drought? Well, have had droughts before without trouble
  - Was it caused by associated fungi?
  - Will climate change drive this further?
- At the IUFRO conference, see world-wide pattern of secondary's rising to primary significance
- Often these Christmas trees are noble fir growing way below their normal elevational ranges, but grand fir and Douglas-fir also got hit, worst in noble fir.
- Many of these plantations are on agriculture sites
- Biotic and abiotic stressors do induce Douglas-fir pole beetle and Douglas-fir engraver
- In Washington, saw both drought impacts this year and some associated beetle activity
- May also have root weevil and rain beetle (Scarabaeidae) in theses Christmas tree plantations
- Brown marmorated stink bug is quite fond of Douglas-fir and grand fir twigs.
- Discussion: Beth Willhite – thought there was possible grey literature on Pity's in DF by Dave Overhulser (turns out to have been for DF twig weevil)
- Climate change website – send folks to it – by USFS
  - Dave Cleaves is in charge
  - Pretty good site

Western Bark Beetle Research Group report –lead by Rob Progar; many scientists on the phone
(Some research projects also described in the BB PROJECTS section below by their FHP cooperators)
Jose Negron: glad someone from research could come to BBTWG ☺
Steve Seybold: Lee/Tom can cover issues

Chris Fettig (with notes pulled from the R4 handout of projects):

- Special issue in Forest Science on MPB in April 2014. WO-R&D funded several papers, available online now, called "A synthesis of the state of knowledge: MPB, a major disturbance agent in United States coniferous forests"
  - EG…Fettig, Christopher J.; Gibson, Kenneth E.; Munson, A. Steven; Negrón, Jose F. 2013. Cultural practices for prevention and control of mountain pine beetle infestations. Forest Science http://dx.doi.org/10.5849/forsci.13–032.
- Book chapter completed on insecticide tools, authored by Fettig, Grossman, and Munson
  - PUBLICATION: Fettig, C.J., D.M. Grosman, and A.S. Munson. 2013. Advances in insecticide tools and tactics for protecting conifers from bark beetle attack in the western United States. In: S. Trdan (Ed.) Insecticides - Development of Safer and More Effective Technologies. InTech, Rijeka, Croatia. P. 472-492.
- SPLAT Verbenone (funded by FS-PIAP and others); SPLAT Verbenone Plus is now registered by EPA and in several western States. Book chapter on SPLAT, etc. and expect the first publication on this in a Journal soon. Trade name: SPLAT Verbenone Repel, still with (ends here)
  - **Verbenone plus area treatment**-finish this year, LPP (Fettig, Munson). Baited control: 80 trees attacked, 49 killed. Verbenone pouch (125 U/ha): 36 trees attacked, 15 killed. SPLAT Verb Repel (875 g a.i./ha): 21 trees attacked, 8 killed.
  - **SPLAT Verb Lodgepole and Ponderosa Pine Single Tree Study –** Lodgepole pine study in Wyoming is completed (Fettig, Munson, Agenor Mafra-Neto). Fettig, Steed, Agenor Mafra-Neto and Progar expanded the SPLAT Verb study to include ponderosa pine/MPB and lodgepole pine/MPB in areas of outbreak populations of the insect in Montana (funded by PIAP, ISCA Technologies, FHTET). SPLAT Verb is now registered by USEPA (August 2013, label attached) and several western states. With suitable funding, we hope to develop SPLAT Verb Plus for western pine beetle, and expand the evaluation of SPLAT Verb into other systems (e.g., whitebark/MPB) in 2014. Publication: book chapter discussing development of the SPLAT technology and its application in several other systems, and anticipate submitting our first technical/scientific publication on SPLAT Verb this winter. Mafra-Neto, A., F.M. de Lame, C.J. Fettig, A.S. Munson, T.M. Perring, L.L. Stelinski, L. Stoltman, L.E.J. Mafra, R. Borges, and R.I. Vargas. 2013. Manipulation of insect behavior with Specialized Pheromone & Lure Application Technology (SPLAT®). In: J. Beck, J. Coats, S. Duke, and M. Koivunen (Eds.) Natural Products for Pest Management. ACS Publications, Washington, DC. P. 32-58.
  - **Verbenone splat area treatment -** final year (Fettig, Munson, Agenor Mafra-Neto). Area results are promising for Splat Verb in lodgepole. Significant difference between SPLAT Verb and the other two treatments, Verb pouch and controls.
- Efficacy of tree injections – studies of whether injection of Emamectin benzoate in late summer/early fall will protect next summer; better (same year) when combined with proponizol; Pest Management Science – Fettig et al.
  - **Effectiveness of Emamectin Benzoate and Propiconazole for Protecting Lodgepole Pine from Mortality Due to MPB Attack** (Fettig, Munson, Grosman, Bush) (funded by PIAP and Arborjet). Results: injections of emamectin benzoate applied in late summer or early fall will provide adequate levels of tree protection the following summer, and that by combining emamectin benzoate with propiconazole (fungicide) tree protection is afforded the same year that

injections are implemented. The associated publication is now available "early online" in Pest Management Science. Fettig, C.J., A.S. Munson, D.M. Grosman, and P.B. Bush. 2013. Evaluations of emamectin benzoate and propiconazole for protecting individual *Pinus contorta* from mortality attributed to colonization by *Dendroctonus ponderosae* and associated fungi. Pest Management Science, (wileyonlinelibrary.com) DOI 10.1002/ps.3612

- Two ongoing bark beetles on forests – spruce beetle in Engelmann spruce and mountain pine beetle in lodgepole pine – Ross and Fettig sponsored student working on this
  - **Impacts of Mountain Pine Beetle Outbreaks on Forest Fuels and Other Stand Attributes in the Intermountain West**(Fettig, Munson, Steed, Negron, Jorgensen).Poster available upon request
- Carbaryl work continues
  - **The Efficacy of Spring and Fall Applications of Carbaryl for Protecting Individual Lodgepole Pines from MPB Attack** (Fettig, Munson, Gibson). Data indicates spring or fall treatments provide two years of treatment efficacy using carbaryl.
  - **The Efficacy of Spring and Fall Applications of Carbaryl for Protecting Individual Ponderosa Pines from MPB Attack** (Fettig, Munson, Blackford, Lazarus). –Prelim data shows 2 years for spring, waiting for fall analysis.

FHTET related – special project needs?

FINDIT report by Brytten Steed

FINDIT is software for use in analyzing plot data for bark beetles. Current WINDOWS version was created by Barb Bentz from old Data General program, now into Phase 3 with an STDP proposal to FHTET. FHP (R1, R4, R6 maybe R2) and Barb Bentz have wanted to get it updated and FHTET on it for 5 years now; want to hire a contractor to program. Want names of anyone else who might participate by 11/12 **(OPPORTUNITY)**

High Elevation White Pine Database-shared by Brytten

- Housed in R1, MT. Blakey Lockman and Gregg DeNitto working with Tony Courtier (FHTET contractor)
- Still firewalled, has data in it
- Soon can use this

What about other important databases or technology needs?

- Give Bob Rabaglia a list of our issues/needs and he'll talk to his new boss (Frank Sapio) on Monday.

ACTION ITEM: Talk to FHTET about needs for technology-related assistance

- Examples of needs to address
  -BBTWG website maintenance and email list
  -FINDIT and other DB development
  -EWS database
  -FIDL coordination
- Much of this is due to Kathy Sheehan moving on. Need a well-crafted, laid out rationale and exactly what is desired. FHTET has a steering committee that will need to sign on. Judy Adams just retired, so what are they going to do? Expect this: somebody has to pay for it. First step is to get a list gather and develop rationale. Present in the form of an issue paper.

Responsible Parties: Brytten Steed, Bob Rabaglia, Iral Ragenovich, and Steve Munson

FIDL update by Iral Ragenovich, who gave the status report for the bark beetle FIDLs on behalf of Kathy Sheehan

- DONE / UP TO DATE?: WPB, MPB (2x); California five-spined ips; DFB (2 x); JPB; BTB; FE; RTB; Silver fir beetle and Fir root beetle; Arizona five-spined ips; white spotted fir borer; SB; Ips in South; Ambrosia beetles of western conifers; Invasive bark beetles; California flatheaded borer
- Needing revision (?) or in process: Six-spined Ips; DFB – in process by Sandy Kegley and Mel Furniss; *Dryocoetes confuse*s – in process by Joel McMillin and Danielle; Pinyon Ips – in process by Joel McMillin and Brytten Steed; California five-spined ips under revision by Beth Willhite, Glenn Kohler, and Rob Flowers; California flatheaded borer; flatheaded fir borer; Monterrey Pine Ips (*Pseudips mexicanus*); white pine cone beetle **(OPPORTUNITY)**
- Bark Beetle Technical Working Group folks set out to do these revisions and have done many.
- Kathy Sheehan has coordinated FIDLs in the past but is now moving on to a new job. Some uncertainty whether her successor will continue to act as the FIDL coordinator.

Western Forest Insects update by Iral Ragenovich

- Revision is still in progress, goes in fits and starts. About 75% of the book has been revised.
- Excluding first chapter, there currently are about 450 pages of text on insects. May exclude the first chapter (about 50 pages) in this revision – it is not used much and gets dated fast.
- Some sections still in process
- Currently lacks: cockroaches, grasshoppers, plant bugs, assassin bugs, true bugs, cicadas, tree and leafhoppers, rove beetles, stag beetles, click beetles, scarab beetles, clerids, tenebrionids, Cucujids (been split), chrysomelids, snout (true) weevils, cone beetles, *Hylergops, Hylastes, Pityogenes*, midge leaf miner and tachinid, Ichneumonids. In progress: spiders, mites, Carabids (Jim LaBonte), click beetles (Glenn Kohler), Spiders (Rob Flowers). **(OPPORTUNITY)**
- Leps done (~1/3 of book), a lot by Jeff Miller
- Iral has a scientific editor on purchase order to help overall
- Still needs a regular editor to do the actual editing
- Has some $$ to print (R6, R2, and R10 have all kicked in $$)
- Need photos – Iral will send out specs for photos and list of what needs to be done. Anyone with photos please send to Iral. **(OPPORTUNITY)**
- R6 website (follow link to WFIWC) has a listing of some chapters and what's needed, but not really up-to-date at the moment.
- WFIWC's Common Names Committee is available to help get any needed common names within these updated sections approved by ESA

Identification Aids for Bark and Ambrosia Beetles by Jim LaBonte, Oregon Department of Agriculture

- Mostly PowerPoint driven
- Screening (not comprehensive) aids
- Uses state-of-the-art extended focal photography and their own Scanning Electron Microscope
- Every character state has an image
- List of aids:
  - Western Scolytinae, by Jim LaBonte and Steve Valley (PowerPoint)
  - Eastern Scolytinae by Jim LaBonte, Steve Valley, Richard Hoebeke, Bob Rabaglia; not as detailed, needs updating (PowerPoint)
  - Buprestidae and Cerambycidae of the western USA by Jim LaBonte, Steve Valley, Josh Vlach, Chris Niwa (PowerPoint); cut off at the Intermountain States, do not include the Southwest; Cerambycidae screening aid is the only one addressing exotic *Monochamus*

- Walnut Twig Beetle (pdf); in revision
- An Illustrated Key to *Dendroctonus* of North America (PowerPoint); in revision
- An Illustrated Key to Species of *Ips, Orthotomicus*, and *Pseudips* of North America (PowerPoint); working on and want to publish
- An Illustrated Identification Guide to the Adventive (Non-Native) Weevils (Curculionoidea) of North America by Richard Hoebeke and Jim LaBonte (book); this is more a picture book, set up with colored tabs like a bird book

- Please use the *Dendroctonus* and *Ips* et al. aids and give feedback **(OPPORTUNITY)**
- Jim is open to setting up identification workshops. ODA has a new facility that can accommodate up to two dozen people, and they have a dozen microscopes. No fees. **(OPPORTUNITY)**

Dave Wakarchuk (Synergy Semiochemical, Inc.) work update

- New insights into bark beetle chemoreception
- Reminder MCH patent in 1977 by MacGregor, Furniss and Daterman for FS
- Alpha-pinene is monoterpene; converts to verbenone; ~1-5% of total monoterpens so what about other monoterpenes – especially 12-13 other common ones? Is verbenone only stop signal for MPB? Brian Sullivan, Will Shepherd, Jorge Negron, and others will help look at this (?)
- Seybold's paper (?)… terpenes are attractive but toxic… what to do? Oxidize them!
- Maybe key is in the ratios of the common terpenes?
- Process and initial field results:
  - GC-EAD to determine which species/gender/etc recognizes what terpenes
  - Many resulting candidates, many unknown
  - One example of potential MPB inhibitor was "carveol" (oxidized limonene), one of the flavor agents in Wrigleys mint gum
  - Tested 2013 in LPP on MPB: 1g verb pouch (versus 7g), added conophthorin (fungal volatile) and conophthorin+carveol [Kegley, Sturdevant, Lazarus]; verb+conoph=70% protection while v+c+carveol gave slightly less (but cheaper!)
  - Another example is DFB inhibitors that may work better than MCH and are less expensive!
  - Found carveol is an attractant to DFB; enhances trap catch with hot lure
  - Found verbenone in DF bark but DFB doesn't seem to care about it;
    - Although MCH is noticed by MPB! (Deepa P did that research)
  - Verbenone…. If you seek declining trees (e.g. wood borers and secondaries), look for oxidized alpha-pinene (verbenone) but if you're a primary beetle, avoid oxidized terpenes
- SO… there are fully or partially oxidized terpenes that are recognized by beetles; some have biological activity with effects likely different by beetle species
  - Even Xyloborine Scolytines recognize many of these volatiles
- Canadian government had funded quite a bit of work and they are moving forward
- Needs collaborators to test stuff!!! **(OPPORTUNITY)**

Harold Thistle FHTET special funding – message sent to Beth:

- Go ahead and assume some $$ will be available
- Must have a meterlogical element (e.g. weather) or tie to elution or spray system to apply; often as enhancement to larger project but could be stand-alone project; integrate weather data into the project completely
- Iral sends out the call letter for this along with guidelines (~Feb)
- committee already exists (1 member per region) to evaluate these
- contribution is $50,000 or less in a year
- funding is for 1-year projects

BARK BEETLE PROJECTS AND STUDIES

(compiled from Schaupp's notes and participants handouts; projects are listed under the person who presented them although most involve several people in the room)

MOUNTAIN PINE BEETLE

Nancy Sturdevant (R1) – handout and discussion

- **MPB (LPP):** Preliminary results 2013 of new anti-attractant compounds against MPB on individual trees (PI=Kegley, Sturdevant, Wakarchuk; Funding=Synergy / Internal)
    - *details mentioned by Wakarchuk*
- **MPB (WBkP):** Evaluation of daylighting and pruning whitebark pine on MPB activity (PI=Sturdevant, Bruce Erickson [silv on Lolo NF]; Funding=internal)
    - Preliminary results suggest daylighted trees may have fared better BUT density of baits and stand basal areas between treatment and control areas (and other factors) may have confused results

Brytten Steed (R1) – hand out list of projects including:

- *(3 continuing and 2 proposed projects – details presented by Progar)*
- **MPB (LPP):** The influence of MPB outbreaks on carbon and nitrogen cycling in LPP ecosystems (PI=Hansen; funding=EM project completed in 2013; FHP sponsors C. Jorgensen and B. Steed) *(completed 2013 – not discusses)*
- **MPB (WBkP):** Susceptibility of high elevation pines to mountain pine beetles gaining increased access by warming climate (PI=Ken Raffa and Phil Townsend; funding: NSF proposed for FY2014) *(not discussed)*

BES presented for Joel Egan (MFO)

- **MPB**: Landscape scale monitoring to assess changes in wildland fuels and simulated fire behavior associated with mountain pine beetle-caused tree mortality (PI=Keane ; Funding= EM Fire)
- **MPB:** Effects of variable retention silvicultural treatments in LPP stands on MPB activity, wildfire hazard, and their interactions (PI=Sutherland ; FHP Lead=Egan [includes Steed]; Funding= STDP)
- **MPB:** Simulation model for predicting mountain pine beetle distribution and propagation: Understanding climatic, biophysical, and host controls on recent bark beetle activity (PI=R1 Zach Holden and contractor Erin Landguth ; FHP cooperators Egan and Steed – work continuing without monetary support

BES presented for Sandy Kegley (CFO) and Carl Jorgensen (BFO)

- **MPB (WBkP):** Whitebark pine stand conditions after mountain pine beetle outbreaks in Idaho, Wyoming and Montana (PI=Steve Cook and Kendra Schotzko; FHP Sponsors=Jorgensen and Kegley; funding=EM)

BES presented for Lee Pederson (CFO)

- **MPB (WBkP):** Influence of MPB on fuels, foliar fuel moisture content, and litter and volatile terpenes in whitebark pine. (PI=Chelsea Toone and Dr. Mike Jenkins, Utah State; funding= EM)

Darren Blackford (R4)

- Discussion: Asked group about persistence of emmamectin bezoate in the system after injection
    - Grossman sent very detailed paper on this
    - Fettig also cited paper in Japan on pines
    - Both will be put into drop box **(OPPORTUNITY)**
  - **Evaluating and Monitoring Mountain Pine Beetle Infestation in Fire-Damaged Ponderosa and Lodgepole Pine Stands** – Proposed EM Project (Lerch/Bentz/Blackford/Raffa).....pubs pending.
- OTHER INFO:
  - **Monitoring the Impact of Climate Change on Foliage and Stem Volatiles and the Frequency and Severity of Fires in Great Basin Bristlecone Pine Sky Island Ecosystems** (Curtis Gray, Mike Jenkins(USU); Justin Runyon (RMRS); and Reboletti).
  - **Publication:** Morris, J.L.; A. Brunelle; A. S. Munson; J. Spencer; . M.J. Power. 2013. Holocene vegetation and fire reconstructions from the Aquarius Plateau, Utah, USA. *Quaternary International* 310: 111-123.

Thursday, October 31 (26 people present)

Agenda Items

Bark Beetle Projects and Studies (cont.) 8:00-12:00

P/S/R, EM, STDP, FS-PIAP and others; recently completed, on-going, proposed, wish list

- Mountain pine beetle
- Douglas-fir beetle
- Spruce beetle
- Jeffrey pine beetle
- Western pine beetle
- Ips spp.
- Fir engraver
- Western balsam bark beetle
- Native woodborers and ambrosia beetles
- Invasives

Mission Statement – adoption 1:00 – 1:30

Bark Beetle Research Priority List- next steps 1:30 – 3:15

Open bin discussion 3:30 – 4:00

(e.g. explore opportunities for projects, collaboration, coordination, etc.)

Final Business 4:00 – 5:00

- Review Action Items
- Review Joint Meeting Format
- Next Meeting (Date, location, etc.)

NOTES: BARK BEETLE PROJECTS AND STUDIES (cont.)
MPB (Cont.)

Chris Bone (University of Oregon, Geography Department) – presentation on NFS proposal
-MPB / ALL HOSTS – W USA

- MS/PhD at Simon Fraser University; MS on MPB and Post-doc on MPB
- NFS proposal he's hoping to find folks who will collaborate **(OPPORTUNITY)**
  - In leading GIS classes and would like projects for his students
- Merging policy and physical worlds: specifically looking at government and policy interactions with forest ecosystems (forest disturbances, beetles, fire, climate, vegetation manipulation, etc.)
  - Creating MPB dispersal model
  - Covering the US West
  - Simulating local behavior of MPB and host across huge landscapes
  - Bridging between "Bug=Host" at local level and at landscape level (GIS)
  - E.g. interannual climate variability has strong local impact versus longer term effects and impacts of long term climate change; this interannual change is major focus of proposal
  - Would like input from specialist like BBTWG folks who make MPB occurrence maps to help evaluate models and provide input; computational model will allow jiggling of parts to observe overall effects
  - Other BB's too much to deal with now
- Chris has some concern over how this will play out politically; want to avoid predictive statements but rather show how part interact
- Beth will send out what Chris sent her (prospectus and letter)

- Discussion: Andy Graves comment: didn't this get examined in AK with spruce beetle? Yes, by Barbara Flint (?) and ? Farlane???; community incentives and trust, people on ground, perception/risk work, etc.

Rob Progar (PNW)(*projects he and Fettig are heavily involved with; many in room also participating*)

Completing in 2013

- **MPB (LPP):** Silvicultural sanitation and verbenone antiaggregation to deter MPB attack of LPP stands across the western United States (PI=R.Progar; FHP Sponsor=S.Munson with numerous collaborators in various regions including Jorgensen and Steed; funding=self-funded but was STDP previously)
    - one paper out in 2012 – on line through J. Econ. Ent
    - included info in J. For. Science special issue (Fettig, Gillette, Progar)

Continuing into 2014:

- **MPB / OTHER (LPP/PP):** Combining fungal metabolites and fungal insect pathogens for cost effective control of bark beetles in forestry (PI=Montana Microbial Products with Steed, Fettig, Progar; funding=NSF)
    - *Beauveria* treatment had problems with application; spores are attached to clay and suspended in a fine mist – typical carbaryl-spray type equipment didn't work well
    - *Beauveria*'s challenge is the beetle has to be well infected by fungus before it starts to bore so it dies before much damage is done
    - Test was commercial strain on MPB but they are working on finding more specific, virulent strains and are starting tests on other bark beetles
- **MPB (LPP, PP):** (Evaluation of SPLAT in LPP and PP of SW Montana – in comparison with *Beauveria bassiana*) (PI: Fettig with Steed, Progar, and Montana Microbial Products; funding=internal)
    - SPLAT looked great in both the LPP and PP; will do final tree mortality evaluation spring 2014
        - Cost information yet to come out for commercial purchase but it is available
        - Interesting "halo" effect around treated LPP we hope to investigate more
        - Concern over treatments in PP since WPB and *Ips* species also in with MPB (and not just dividing up tree… but playing in same parts of tree! Who's more important, really?)
    - Discussion: Wakarchuk comments:
        - Effective radius of pouch is 5 meters
        - Need many sources of elution to better simulate infestation; this was thought of flakes but problems of flakes is that small points elute quickly
        - SPLAT elution he suspects is like that of flakes – without membrane it is a low, log decay
        - Conundrum is balancing release efficiency versus cost (device and application)
        - Offered to make little bubble caps to try against SPLAT product for free to test (OPPORTUNITY)
    - Discussion: Iral comments:
        - Get the met station out there (Harold Thistles?) and use the plume model to see if you can determine the effects of multiple elution points from SPLAT versus fewer points from pouches

Proposed in 2014:

- **MPB (LPP):** Effects of Mountain Pine Beetle (MPB) Outbreaks on Fuels, Carbon, Stand Structure and Composition, and the Availability and Suitability of Snags for Salvage in the Intermountain West (PI=Fettig; FHP Lead=Munson; funding=proposed EM-fire as extension of previous 3 yr study)
- **MPB (WBkP):** Evaluation of the efficacy of three formulations of verbenone (pouches, SPLAT® Verb, SPLAT VERB REPEL®) for protecting whitebark pine from colonization by mountain pine beetle.(PI= Progar and Fettig; FHP Lead=Steed; funding= proposed STDP)

Barbara Bentz (RMRS)(phone)

- **MPB: thermal models**
    - continued work on MPB thermal models for Intermountain North (R1 RO request)
    - STPD with Joel McMillin in SW White Pine to add to this
    - Special Forest Science Issue paper with Tom Coleman
    - Model being redefined with more data for several hosts and several elevations across all of CA; (more UT data, too?)
    - Model never resulted in 2 MPB generations/yr but maybe 3 generations over 2 years
    - Messy data

Rob Flowers and Glenn Kohler (OR/WA)

- **MPB: ADS map data**
    - R6 FHP funding; especially interested in intense outbreak estimations
    - Installed transects, and overlaid with aerial photos, to produce a better guide for surveyors to improve estimates
    - Problems with that so next year they will do PLOTS first then fly

DOUGLAS-FIR BEETLE

Laura (Lazarus) Lowrey (R4)

- **MCH deployment strategies**
    - PI Darrell Ross with grad student Harrison Brooks
    - Varied MCH deployment strategies with different number of caps
    - Will present results at WFIWC
- **Biodegradable MCH cap**
    - PI Darrell Ross with Hercon Environmental: testing of a biodegradable MCH cap but this site burned this year
- **MCH dosage trial**
    - With Nancy Gillette following up on previous tests in Sun Valley using lower doses of MCH flakes; testing the actual label dose
    - Using Nancy's protocol of 3 TRTS, 4 reps, 2 ac plots w/ baited trap in center
    - Results: Nancy is helping include statistician; high attack rates/pressure in control (70 trees/acre); appears there is a clear dose response; will present at WFIWC
    - $70-80/acre cost for flakes at labelled rate + cost of helicopter (aerial contract is over $30/acre
    - Did work under CE as did Connie Mehmel;
    - now need certified pesticide applicator involved!
    - Also, there is some limit to size of area that can be treated this way
        - Darrell said ~500 acres is about max unless "refugia" patches are left
    - If there is active DFB in an area, MCH can fail; need to work on this question of how much infested and need to remove infested???

Joel McMillin (R3)

- **MCH – FIRE and wood borers**
  - Has seen a big increase in DFB in fire areas (from ~15/trap/day to ~150/trap/day); particularly of concern in recreation area
  - Tried trapping – asked for $$ to do this (with Carl Jorgensen and Steve Cook) but didn't get the money so did work haphazardly in AZ)
    - Some attraction of buprestids to MCH?? (2 bubblecaps per trap in Wallow Fire area)
    - Also used verbenone and found cerambycids were attracted
  - Discussion: David Wakarchuk comments:
    - *Monochamus* uses verbenone as a kairomone (they trapped, too)
    - Europeans reported this for *M. Galloprovincialis* in Spain
  - Discussion: Beth Willhite comments:
    - MCH (1 cap/trap) using 2 traps near her house caught nothing
    - Alpha pinene however, caught *Monochamus* and click beetles

Nancy Sturdevant (R1)

- **MCH – FIRE**
  - Applied MCH to largest, highest hazard DF scored in fire to prevent DFB population buildup
  - Seems to have worked; PVT landowner adjacent hit hard
  - 2014 will reapply MCH in moderately scorched DF stands they want to retain

Rob Flowers (OR)

- **MCH – grid over riparian area (fire???)**
  - Will apply MCH in grid to protect riparian corridor nearby. Will it work? Probably

SPRUCE BEETLE

Darren Blackford (R4)

The following is from the R4 handout of activities related to MPB:

- **Emamectin Benzoate for Protection of Engelmann Spruce from Spruce Beetle** (Fettig, Grossman, Munson, Blackford)-WIP. Evaluating spacing differences and seasonality differences.
- **Novel Semiochemicals for Managing Spruce Beetles** (FY2014-16) (Hansen, Wakarchuk, Munson, Reboletti). OBJECTIVES: To improve the spruce beetle lure and develop semiochemicals that can be used as single tree and area protection against spruce beetle infestation. Funding: Salaries from RMRS and FHP were contributed for this project in FY13, FHP-OFO provided $5,000 out of our operating budget to help cover Matt's costs, and Dave Wakarchuk provided the pheromones.
- **Spruce Beetle** (**Fettig, Munson, Hebertson, Ott, Ross) and Mountain Pine Beetle (Fettig, Munson, Negron, Runyon) impact studies –Both EM projects** Two ongoing studies examine the effects of bark beetle outbreaks on forests, e.g.. fuel loads, fall rates, residual tree growth, residual vegetation, regeneration, invasive species, wood deterioration, carbon loading. (Lodgepole pine/MPB; Engelmann/SB) The work in Engelmann spruce started this summer and is being led by Dan Ott (Daniel.Ott@oregonstate.edu), a PhD student with Ross and Fettig.

Discussion notes:

- **New Semiochemicals**
  - w/ Steve Munson, David Wakarchuk, Danielle Rebolletti, and Matt Hansen

- first pass of novel compounds to check for antennal activity
- found one compound that does seem promising for shutting down a hot lure (hot lure so strong it competes with infested bolts)
  - so many beetles in traps they weigh them rather than count them!
- Will test again by incorporating MCH as the standard "shut down"
- New compound is 1/10th the cost of MCH

- **Tree injection**
  - w/ Munson and Grossman???
  - TreeIV system working best for them (versus quick Jet)
  - 6 treatments – testing narrow and wide injection spacing, spring and fall timing
    - No Results Yet
    - noted some variability in time of day and tree species being treated for how well injections took
    - still some concern over environmental fate of EB
    - prior tests with wide spacing resulted in strips of protection
- **Landscape / thinning**
  - NF did thinning in advance of beetles but got blasted
    - 20 miles away is landscape level outbreak of SB
    - Recall landscape study (Darrell Ross, Dan Ott, Chris Fettig) (#4 on handout?)

Bob Cain and Tom Eager (R2)

- **Status of efforts**
  - No current projects – FHP try to monitor for outbreak edge; Forests are doing lots of salvage
  - 2013 East Fork Fire – lots of SB affected stands
    - Note that some academics still deny what the fire fighters have seen: needles "vaporized" in fire with fine branches remaining
    - Lots of sanitation and salvage but SB is still "winning"
  - Seeing "spotting" of masses of SB long distances – aggressive and impressing
  - Last year Roy Mask looked hard at live cycle – plots by elevational gradients on Rio Grande
    - found most had 2-year life cycle with minimal 1-year life
    - populations so high they were hitting way up in tree
    - plans to write up results in next year
  - some carbaryl spray efforts;
    - successful if they use bucket trucks;
    - about ¼ of trees done at one site and all non-treated trees died
    - still need to wait a couple years to see if treatment truly worked or if they find attacks up at top where they couldn't spray well

    Discussion: Darren Blackford noted that trees larger than 18" often were not successfully sprayed; they'd get hits in the tops and work their way down; couldn't cover bole sufficiently well

    Discussion: Bucket truck work done successfully by Manti-LaSalle NF (Darren noted); McMillin also noted past success with bucket truck applications (AZ?)
  - Extirpation of spruce in some areas!
    - Hitting down to 1" trees in some areas
    - Darren suggests treating the smaller regen
    - Ideal to spray to 8" diameter but with hitting so small not sure what ideal diameter should be

- Tom E (and Darren B) have not seen secondary BBs impact spayed trees
  - *Ips* get into tops of blowdown trees
  - Wonder if after SB whether there will be an Ips eruption
  -
  - Brytten noted *Ips perterbatus* killing >14" ES in root disease areas in MT

JEFFREY PINE BEETLE

Joel Egan (R1)

- **JPB:** Creating a Spatially dependent probability of Jeffrey pine beetle-caused mortality model for the Lake Tahoe Basin (PI=Egan w/ U of Washington statisticians ; funding=STDP)

WESTERN PINE BEETLE, RED TURPENTINE (other western *Dendroctonus*)

(nothing reported)

SOUTHERN PINE BEETLE

Steve Clarke (R8)

- **National Program**
  - National program run by John Novak; 1.1 x 10^6 acres treated so far;
    - had to use 2013 $$ for suppression rather than prevention
    - populations still very low
- **Projects:**
  - Trapping across MI river to see if beetles will travel; got funds from Harold's grant to look at meteorological data that might affect migration; so far there is no solid evidence of SPB established west of river
  - Competitors and predators
    - Looking at *Monochamus*, clerids, *Ips*, black turpentine beetle;
    - What do they do as SPB populations decline
    - 3 sites, 15 traps per site for each lure combo used
    - Looking at effects of forest management in maintenance of competitors and natural enemies
  - SPB Portal used by many states
    - Housed at FHTET; started design in 2007 and up running well in 2009
    - Has core values, upload utility, data validation, Google Earth and GIS capacity
    - Added public entry portal in 2012/2013
    - Initiated similar effort with Ron Billing for Central America
- **STDP proposal(s):**
  - Improving SPB survey
    - Now using # beetles/day/trap in spring sample and #SPB/#clerids
    - Looking for degree day model to when to start trapping (now use blooming of dogwoods)
    - Current system not as good as some think; only 50% or so successful prediction
      - Bob Rabaglia said in MD it didn't predict outbreaks well at all
      - Staggered emergence vs. synchronous emergence is probably important
  - Develop aps for mobile devices to automate the entire SPB data collection process, including aerial survey

IPS SPECIES

Glenn Kohler (WA)

- **California 5-spined ips (*Ips paraconfusus*) - new findings**
  - It's a new record for WA
  - Killing large trees in Columbia Gorge along with WPB and RTB
  - EM $$'s to monitor for 2 years (hoping to get more)
  - Keep finding it further north! Usually think of areas north of Columbia River as territory of *Ips pini*

Beth Willhite and Rob Flowers (OR)

- **California 5-spined ips – trapping findings**
  - find that where trap catches are high of one species they are low of the other (in both states)
  - appear to have 3 flight peaks in OR Willamette Valley but not quite clear in WA (looks like 3 is likely)
  - Phereomone use:
    - WA uses racemic ipsdienol for *Ips pini* trapping(*I. paraconfusus* won't come to it… fussy); also found *Ips pini* will come to the (-) isomer
    - OR uses the "California" *Ips pini* lure (with (-)- ipsdienol
    - *Ips paraconfusus* lure is 3 component: ipsdienol, ipsenol, and cis-verbenol
    - This period (2008-present) is the first time traps baited with California five-spined ips pheromone lures have been deployed in Oregon and Washington –they may be a more sensitive detector than the traditional collection methods used in the past. It may never be known with any certainty whether *Ips paraconfusus* has always been present but undetected outside of the westside California/Oregon range published by Struble and Hall (1987), or whether it has actually expanded its range further north and east in recent years, perhaps due to humans planting more pines in the lowland valley areas or climate change

Steve Clarke (R8)

- ***Ips* spp monitoring with Univ. of Arkansas**
  - EM project
  - Better ways to capture Ips mortality on the landscape?
  - Using roadside surveys and trapping; developed method of calculating dead trees/acre from roadside survey
  - Trap catches corresponded poorly with tree mortality

OTHER SECONDARIES

fir engraver, western balsam bark beetle, native woodborers and ambrosia beetles

Brytten Steed (R1)

- **Itty Bitty Pity's:** Trapping secondary bark beetles attracted to verbenone in whitebark pine stand (PI=Steed, Fettig, Emily Giberson (BLM); funding= internal)
- **Wood borers:** (see description from Darren on work by PI=D. Miller; funding=SRS internal)

Darren Blackford (R4):

- **Wood Borers: One operational trap lure for all North American species of sawyers (Monochamus spp.) and associates** (Miller, Munson, Steed, Eglitis, Carlson, Poland, Raffa, Sweeney, Alison)**.** Funding: Current funding source is USDA-FS, Southern Research Station. Past sources included STDP and FHP-WO. Objective: use such a lure for detection of North American species in other countries as well as for assessments of diversity and function in North America. The present study looked at the effects of ipsenol and/or monochamol on catches of beetles in traps baited with alpha-pinene and builds on some previous work conducted in 2007 and 2008 with participation from around the continent.

Bill Schaupp (R6)

- **Flatheaded fir borer, *Phaenops drummondi* (Buprestidae):**
    - Formerly in genus *Melanophila*
    - In southwest Oregon, a primary killer of Douglas-fir; no evidence of Douglas-fir beetle
    - Chronic, ongoing mortality occurs at low elevations mostly on moderate slopes in southwest OR
        - suspect D-f hosts at lower end of ecological amplitude, stressed (high % verbenone in bark samples)
        - causes increased mortality following periods of below normal precipitation
    - Ongoing analysis of aerial detection survey data, seek edaphic/weather/topographic relationships & risk rating
    - Set-up transect, thinned afterward, will monitor (private land)
    - No silvicultural recommendations available; after some heavy thinnings entire residual killed by FFB
    - Cut/sectioned one green infested D-f:
        - short distance from bark crevices (eggs laid there) to cambium for neonate larva to cover
        - resinosis and larval mortality at top of tree, successful brood at base
    - So far no reliable signs or symptoms to detect green D-f infested by FFB; by fading time, other woodborers also in tree
    - Working with ecophysiologist Barbara Lachenbruch at Oregon State Univ. (EM proposal not funded)
    - Lots more to do

INVASIVE SPECIES

Lee Pederson (R1) and Darren Blackford (R4)

- **Walnut twig beetle:** Implementing detection and trapping technology for the walnut twig beetle, *Pityopthorus juglandis,* in Idaho, Utah, and southern California. (PI=Steve Seybold, PSWRS with many other people helping; funding= STDP)
    - Caught from Cedar City UT north to Coeur d'Alene ID; CA it's everywhere you look
    - Coleman and Graves also have EM project with Seybold looking at life history and host preferences (see their outreach publications)
    - Mortality is slow with tree resprouting often before it dies; most dead trees have WTB galleries in them
    - Seybold has a nice trapping guidelines paper; tested traps on trees, poles, etc
        - Do not put trap in the tree if doing detection
    - Seybold has many other studies in the works

Tom Coleman (R5)

- **Goldspotted oak borer:**
    - Moving north in CA despite aggressive sanitation
    - San Diego County getting hammered!
        - ~20 reservations in SD county, all in the oak belt
        - Good BIA forester who now has spray rig and has treated ~100 trees
    - Purple panel, purple funnel traps: not completely promising for control
    - Systemic injection has shown promise in lab but not sure about field; TreeIV doesn't work (bole injections are tough to do)
    - Tried preventative sprays – systemics work better
    - Grinding used for suppression/sanitation
    - Testing host range= likes red oaks better than white but it eats them all; loves red oaks >20" dbh
    - Take 2-7 years for tree to die
    - 7-10% of trees on landscape dying in any one year
    - New concerns about fuel loading
    - Looking at growth response 3+ years before death

- **Polyphagous shot hole borer:**
    - Basics:
        - In avocado… big concern! Symptom of "sugar volcanoes"
        - Likes willow, castor bean, and maple especially; hits tiney stems with stem failure
        - 2-4 generations per year
        - east of LA going down coast
        - In East it's only in FL
        - Subtropical species from SE Asia and Australia??
    - starting to look like a real problem;
        - some steep slopes will remain natural refugia despite management efforts
        - probably arrived at same time as GSOB but has spread much more
        - New *Fusarium* only found in CA and Israel
        - Hard to find! Hard to do education on
    - First ID in 2003 but wrong scientific name; CA and Israel populations are genetically distinct although cryptic (but no scientific name yet?)
        - Not the "tea shot hole borer" which is not much of a problem in SE Asia or Australia where it is found
        - Tough to do mating studies since female mates before leaving tree
    - Projects:
        - UCR working on it heavily (Tim Paine and others)
        - Have EM grant to work on it?
        - Proposed STDP to look at host range and cold tolerance
        - Avocado producers doing most funding for study
        - Catch it with ethanol (sort of); clear panel traps on infested trees work best

Bob Rabaglia (WO)

- **Orthotomicus:**
    - Looking for samples of *O chaelatus* (transcontinental)
        - *O. proximus* (European/Asian) was caught in UT by a Russian
        - Is *O. chaelatus* one species or two; Are O.p. and O.c. the same species?
        - Would like help trapping - Need samples in 95% ethanol
    - Bark beetle training – looking for samples to use (May 2014 in Florida for international attendees) (OPPORTUNITY)

FINAL BUSINESS ITEMS

Mission Statement

- Carl Jorgensen (phone) noted he'd looked into this when hosting the meeting in Boise and again during WFIWC
- Munson drafted something and several people gave input to get what you have now
- Not promoting that this be US-centric; should be for western N. America
- Maybe add something about Directors, State Forester, other Leadership?????

Priorities List

- Similar history – most input from those who participated in recent meetings
- Should send list around to entire "Group", not just those present at the meetings
- This is a laundry list and not really "priorities"; better describes the information gaps we see;
- maybe should be pulled together as a briefing paper addressing:
    - why have the list? What's the intended use?
        - Research no longer meeting land managers needs
    - What is research not doing
        - Emphasis for them on non-natives fails to recognize major items of importance to most of western US
        - Research may be able to take our groups list of needs and make a case for continuing work on natives of importance! (a useful tool for research?)
- State, regional and national needs rarely are in common!
- We need to be cognizant of the difference between what we really need to know and what would be "nice to know"; really think about where you'd choose to spend the $$ if you get some
- Once we have knowledge gaps defined, then we need goals tied to them

ACTION ITEM: put the "blue stuff" (top project wishes) into an EXCEL sheet we can refer to later; Also need to update this wish list of specific "blue" items
Beth volunteered to do this but will work with Brytten to see about incorporating them into a database that also includes listing of projects being done (e.g. those reported during the meeting)

Next Meeting:

- Beth will visit with Bob Cain and others in R2 to see of they can do the next meeting; might allow them to have better attendance

MISC ITEMS: WRAPPING UP THIS MEETING

Provide location for sharing papers and info from this meeting

Responsible party(ies): Rob Flowers

https://www.dropbox.com/sh/1fs9mv4dv0c26tp/mrPZiIt4xW (sent 11/7/2013)

Summarize action items

Responsible party(ies): Beth Willhite (sent 2/4/2014)

Summarized Notes

Responsible party(ies): Bill Schaupp (sent 11/20/2013) to Beth Willhite and Brytten Steed who are still wondering how to handle 26 pgs of handwritten notes ☺

Update websites (esp. meeting notes)

*Responsible party(ies): ??? (*http://www.fs.usda.gov/goto/r6/fhp/bbtwg)

ACTION ITEMS: FOR NEXT MEETING

Aim for a combined meeting of North American Defoliator Working Group and Bark Beetle Technical Working Group.

- proposal to meet in Ft. Collins – Jim Labonte could work with Don Bright, perhaps Jose and R2 folks could come if it were closer.
- look at previous meeting locations:

Responsible party: Beth Willhite will contact Bob Cain about this.

Summary on meeting locations (below):

YEAR	BBTWG	WNADWG
2000	R1-CDA	R6-Portland
2001	R3-Taos	R4-Moscow
2002	R5-Reno	R6-Arlington WA
2003	R2-Durango	n/a
2004	R10-Homer	R6-Portland
2005	R4-Midway	R1-CDA
2006	R1-Fairmont	R3-Albuquerque
2007	R6-Portland	R4-Salt Lake
2008	R5-Tahoe	R1-Bozeman
2009	R3-Tucson	R6-Portland
2010	R2-Rapid	R1-CDA
2011	R5-San Diego	n/a
2012	R4-Boise	n/a
2013	R6-Hood River	R6-Hood River

Region	Count BBTWG	Count WNADWG	Total from 2000-2013 mtg count
1	2	3	5
2	2	0	2
3	2	1	3
4	2	2	4
5	3	0	3
6	2	5	7
10	1	0	1
Grand Total	14	10	

Solicit feedback on virtual meeting component.

- "Remote-in" worked poorly for remote attendees trying to see the presentations given at the meeting location; may work if the remote parties want to present
- ask those who tried to join our meeting virtually how well it worked.

Responsible party: Rob Flowers

Appendix A: List of Attendees

ATTENDIES IN PERSON	
Andy Graves (FHP R3)	X
Ari DeMarco (OR State Univ)	X
Beth Willhite (moderator) (FHP R6)	X
Bill Schaupp (FHP R6)	X
Bob Rabaglia (FHP WO)	X
Brad Onken (retired)	X
Bruce Thompson (ConTech)	X
Brytten Steed (FHP R1)	X
Chris Bone (U of OR-Geography Dept)	X
Coleen Keyes (UT Div. of For.)	X
Cynthia Snyder (FHP R5)	X
Darci Carlson (FHP R6)	X
Darren Blackford (FHP R4)	X
David Wakarchuk (Synergy Semio.)	X
Dwight Scarbrough (FHP R4)	X
Gina Davis (ID)	X
Glenn Kohler (WA)	X
Iral Ragenovich (FHP R6)	X
James LaBonte (OSU)	X
Joel McMillin (FHP R3)	X
Kate Hrinkevich	
Laura Lowrey (FHP R4)	X
Lee Pederson (FHP R1)	X
Lia Spiegel (FHP R6)	
Nancy Sturdevant (FHP R1)	X
Rob Cruz (FHP-FHM)	X
Rob Flowers (OR Dept. of For.)	X
Rob Progar (PNW)	X
Stephen Nicholson (Valent)	
Steve Clarke (FHP R8)	X
Tom Coleman (FHP R5)	X
Tom Eckberg (ID)	X

ATTENDEES THROUGH PHONE OR VTC
Amy Gannon (AZ)
Bev Bulaon (FHP R5)
Bob Cain (FHP R2)
Chris Fettig (PSW)
Joel Egan (FHP R1)
Jose Negron (RRS)
Steve Munson (FHP R4)
Susan Gray (FHP R2)
Tom Eager (FHP R2)

REPRESENTED IN SOME ITEMS
Barb Bentz
Steve Seybold

Appendix B: Mission Statement Draft presented during 2013 meeting

BARK BEETLE TECHNICAL WORKING GROUP

DRAFT—04/08/2013

The **mission** of the Bark Beetle Technical Working Group (BBTWG) is to foster communication, coordination and professional interactions among forest health specialists, research scientists and others working to address ambrosia- and bark beetle-related issues in North America.

Our **goals** are to:

1. Increase the overall responsiveness, delivery, and impact of management actions, technology development, and research implemented to address ambrosia- and bark beetle-related issues and concerns.
2. Increase communication and coordination among practitioners and researchers.
3. Increase awareness and sharing of novel observations, ideas and research results.
4. Promote the relevance and impact of our work to partners and stakeholders.

The BBTWG meets annually to provide a forum to address these goals, and to identify, develop, and review proposed management actions, technology development, and research for the coming year.

Appendix C: Bark Beetle Technical Working Group Priorities List – FY2013

Complied by C.L. Jorgensen from 2012 Meeting Attendees

(for additional history on this list see BBTWG meeting notes on website)

1. Improve methods to predict where, when, and how much bark beetle activity will occur on forest landscape
    a. Evaluate methods for determining the relationship between tree physiology and susceptibility to bark beetle attack, including stress factors and constitutive and induced resistance.
        i. Bark beetle attraction to defoliated trees, at what levels of defoliation, for how many years of defoliation, at what source level of beetle populations, for what habitat types. Laura Lazarus FHP- Boise.
            1. Western spruce budworm and Douglas-fir beetle in Douglas-fir (Lazarus, Spiegel, Sturdevant, Carlson, Ross and Wallin).
            2. Western spruce budworm, BWA, and WBBB in subalpine fir
            3. Western spruce budworm and fir engraver in grand fir
    b. Define methods for predicting the occurrence, rate of spread, size, duration and impact of outbreaks for individual bark beetle species.
    c. Refine methods of evaluating landscape – level susceptibility to bark beetle outbreaks.
        i. Evaluate *D. rufipennis* and *D. ponderosae* outbreaks in the Interior West on ecological function and associated impacts. Steve Munson, FHP-Ogden
    d. Determine the role of climate change in predicting bark beetle outbreaks.
        i. Determine bark beetle populations across elevational gradient crossing multiple forest types (Jeffery pine>western white pine>Whitebark pine>foxtail pine) Cynthia Snyder R5 FHP
    e. Utilize information from all possible sources to define what constitutes an outbreak.
    f. Integrate all of the above into operational, predictive models for significant bark beetle – host systems.
        i. Develop a bark beetle and fire interactions models for Forest Vegetation Simulator that invoke outbreaks given a wildfire or prescribed burn, such as integrating Hood/Bentz papers for DFB to FVS, and similar for WPB (Lazarus, Hebertson, FHP-R4).

2. Clarify results and interactions between bark beetle populations, wildfires, and prescribed fire
    a. Define short & long-term ecological relationships associated with bark beetle populations, fuel loads, wildfires and prescribed fire.
        i. Roundheaded pine beetle response to fire. Joel McMillin. Andy Graves
    b. Projects should meet National Fire Plan objectives.
    c. Develop tech transfer tools for bark beetle/fire interactions for the general public.

3. Evaluate, quantify, and describe the effects of no action.
    a. What are post-outbreak conditions on treated versus untreated lands?
    b. Is it possible to see differences in species composition, diversity or species shifts as a result of not taking specific management actions?
    c. What are the consequences of bark beetle outbreaks to forest ecological function, e.g. 1990's spruce beetle outbreak in Alaska?
        i. Evaluate *D. rufipennis* and *D. ponderosae* outbreaks in the Interior West on ecological function and associated impacts. Steve Munson, FHP-Ogden

d. What are the costs of "do nothing" alternatives?
e. Document and summarize case histories.
    i. Historical outbreaks in southern New Mexico. Andy Graves
    ii. Comprehensive report on the Extent and Severity of the current MPB outbreak in Western US and direct comparison to other MPB outbreaks of the 1970s and 1930s, likely a "white paper" – Jorgensen Boise FHP

4. Develop additional technologies for using natural attractants and repellents such as pheromones to protect forest resources
    a. Summarize what is currently known about the effectiveness of semiochemicals.
    b. Develop an appropriate "clearing house" for semiochemical information (webpage, case studies, etc.)
    c. Develop new and improve existing semiochemical technologies
        i. Synergy Semiochemical and SRS are seeking collaborators to conduct field research with newly identified kairomones and pheromones of tree killing bark beetles and wood borers, particularly MPB, WPB, and SPB.
        ii. *Phloeosinus* spp. pheromones? Joel McMillin.
        iii. Improved anti-aggregation pheromone for spruce beetle. Joel McMillin. Andy Graves
        iv. Confirmation of (+)-endo-brevicomin as anti-aggregation pheromone across the distribution of western balsam bark beetle. Joel McMillin.
        v. Evaluate Verb Splat and Verb Plus formulations for MPB in outbreak populations – Steve Munson, FHP – Ogden
        vi. Conduct trapping bioassays for various antiaggregant compounds for *D. rufipennis* – Steve Munson, FHP – Ogden
        vii. What is the effectiveness of MCH treatments for stands with preexisting DFB populations (beetles are already in the green trees at some level)? Laura FHP Boise.
        viii. Protect pines from MPB and WPB, especially after fires (Eckberg, Kegley)
        ix. Evaluate further the use of verbenone and conophthorin to disrupt northern spruce engraver, *Ips perturbatus*, colonization of spruce slash. This could also involve comparisons of verbenone with other non-host volatiles as disruptants of *I. perturbatus* activity in slash (i.e., as lower-cost alternatives). Roger Burnside, AK DNR Forestry.
        x.
    d. Assess and/or develop an attractant for new invasive species (e.g. Polyphagous shot hole borer in southern California) Tom Coleman R5 FHP

5. Validate silvicultural techniques to meet various management objectives
    a. Evaluate and document current conditions of previously installed (10+ years) silvicultural treatments to determine risk to bark beetle (LPP)
        i. Assess the scale of tree mortality from bark beetles and interaction with predisposing agents in unmanaged areas and treatments for fuels and prevention thinning in southern California. Tom Coleman R5 FHP
        ii. Assess the scale of tree mortality from bark beetles and interaction with predisposing agents in unmanaged areas and treatments for fuels and prevention thinning in central Idaho. Laura Lazarus R4- FHP.
        iii.

b. What are slash-treatment alternatives?
    i. Evaluate additional variables for potential management of the northern spruce engraver, *Ips perturbatus*, during forest management operations. Among others, look at the effects of timing of operations (e.g., spring vs. fall slash treatments) and effects of habitat condition (e.g., colonization of disturbed areas vs. closed, residual forest). Roger Burnside. AK DNR Forestry.
c. What fuels treatments may change hazard ratings for bark beetles?
    i. Effects of fuel breaks surrounding Late Successional Reserves. LSRs protect or foster "old-growth" ecosystems. Cynthia Snyder R5 FHP
d. "What are the effects of fuel reduction treatments, including thinning, on bark beetle populations"
    i. Evaluate *Ips perturbatus* response to major disturbances in the boreal forest to better understand factors that precipitate outbreaks, or not. This work has implications on how beetle populations are managed during fuel reduction treatments, long-term timber sales, or large-scale biomass/bioenergy projects and other forest management projects (there is high interest for this information in Alaska right now). Roger Burnside, AK DNR Forestry.
e. Install demonstration areas where stands are silviculturally manipulated according to established risk rating to geographically refine risk models
f. How do forest health restoration treatments affect bark beetle hazard rating?
    i. Southwestern Region's new "Desired Conditions" for different forest types (e.g., mixed conifer forests). Joel McMillin.
g. Develop new strategies recognizing limitations on treatment availability due to wildlife concerns (e.g. lynx habitat) or society stigmas (e.g. clearcutting)
    i. What are the benefits of "individual tree culturing," "daylighting", similar treatments to reduce the risk of western pine beetle attack on large diameter ponderosa pine in the Pacific Northwest and Idaho? (Schaupp and Jorgensen).
    ii. Evaluate effects of daylighting (fixed distance for all selected trees; for fire mitigation) or radial thinning (variable distance based on tree diameter and SDI; for tree vigor) on bark beetle susceptibility, especially for whitebark pines, maybe ponderosa (Egan, Gannon, Steed, Sturdevant, Lazarus).

6. Develop additional technologies and strategies for using insecticides to selectively protect priority resource values on forest landscapes
    a. Evaluate new insecticides and delivery systems.
        i. Evaluate emamectin benzoate treatments for *D. rufipennis*. Steve Munson, FHP-Ogden
        ii. Develop NEW insecticides (critical if carbaryl is removed from tree-use registration, and the pyrethroids are not labeled for forest application), especially to protect pines form MPB. (This may include testing of delivery systems in part a.) (Steed or any of us in Region 1) and Flowers at ODF, Jorgensen FHP Boise.
        iii.
    b. Determine the effectiveness of insecticides for less studied conifer species.
    c. Determine the effectiveness of using lethal trap trees.
    d. Summarize what is currently known about the effectiveness of insecticides.

7. Facilitate technology transfer, improve communication with land managers, and inform the general public.
    a. Strengthen resource education and technology transfer.
    b. Strengthen taxonomy expertise and encourage training sessions to foster identification skills.
    c. Inform land managers and general public of the political/legal ramifications of what we do/don't do and should do/can't do.